

## Engineering Interpretations

### **Construction Material and Excavating**

Soils are rated as sources for road fill, topsoil, sand, and gravel. Suitability ratings of good, fair, or poor are given for soils used as a source of road fill and topsoil. Ratings of probable and improbable are given for sand and gravel. A rating of probable means that on the basis of the available evidence, the source material is likely to be in or below the soil. A rating of improbable means that the source material is unlikely to be in or below the soil. The ratings for sand and gravel do not consider the quality of the source material because quality depends on how the source material is to be used.

### **Road Fill**

Road fill consists of soil material that is excavated from its original position and used in road embankments elsewhere. The evaluations for road fill are for low embankments that generally are less than 6 feet in height and are less exacting in design than high embankments such as those along superhighways. The rating is given for the whole soil, from the surface to a depth of about 5 feet, based on the assumption that soil horizons will be mixed in loading, dumping, and spreading. Soils are rated as to the amount of material available for excavation, the ease of excavation, and how well the material performs after it is in place.

### **Sand**

Sand as a construction material is usually defined as particles ranging in size from 0.074 mm (sieve #200) to 4.75 mm (sieve #4) in diameter. Sand is used in great quantities in many kinds of construction. Specifications for each purpose vary widely. The intent of this rating is to show only the probability of finding material in suitable quantity. The suitability of the sand for specific purposes is not evaluated. If the lowest layer of the soil contains sand, the soil is rated as a probable source regardless of thickness. The assumption is that the sand layer below the depth of observation exceeds the minimum thickness.

### **Gravel**

Gravel as a construction material is defined as particles ranging in size from 4.76 mm (sieve #4) to 76 mm (3 inches) in diameter.

Gravel is used in great quantities in many kinds of construction. Specifications for each purpose vary widely. The intent of this rating is to show only the probability of finding material in suitable quantity. The suitability of the gravel for specific purposes is not evaluated. If the lowest layer of the soil contains gravel, the soil is rated as a probable source regardless of thickness. The assumption is that the gravel layer below the depth of observation exceeds the minimum thickness.

### **Topsoil**

The term "topsoil" has several meanings. As used here, the term describes soil material used to cover an area so as to improve soil conditions for establishment and maintenance of adapted vegetation. Generally, the upper part of the soil, which is richest in organic matter, is most desirable; however, material excavated from deeper layers is also used. In this rating, the upper 40 inches of soil material is evaluated for use as topsoil. In the

borrow area, the material below 40 inches is evaluated for its suitability for plant growth after the upper 40 inches is removed. The soil properties that are used to rate the soil as topsoil are those that affect plant growth, the ease of excavation, loading, and spreading, and those that affect the reclamation of the borrow area.

*This subsection includes:*

- **(a) Construction Materials and Excavating**

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Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
11: Verdigris, OCCASIONALLY FLOODED-----	Not limited		Very limited		Very limited		Not limited		Moderately limited	
			~excess fines (thickest layer)	1.00	~excess fines (bottom layer)	1.00			~flooding (moderately limited)	0.60
			~excess fines (bottom layer)	1.00	~excess fines (thickest layer)	1.00			~cutbanks cave (slightly limited)	0.29
15: Cleora-----	Not limited		Very limited		Very limited		Not limited		Moderately limited	
			~excess fines (thickest layer)	1.00	~excess fines (bottom layer)	1.00			~flooding (moderately limited)	0.60
			~excess fines (bottom layer)	1.00	~excess fines (thickest layer)	1.00			~cutbanks cave (slightly limited)	0.29
16: Cedargap, FREQUENTLY FLOODED-----	Not limited		Very limited		Possible source		Very limited		Very limited	
			~excess fines (thickest layer)	1.00	~excess fines (thickest layer)	1.00	~small stones (very limited)	1.00	~cutbanks cave (very limited)	1.00
			~excess fines (bottom layer)	1.00	~possible source (bottom layer)	0.46	~area reclaim (very limited)	1.00	~flooding (moderately limited)	0.60
21: Osage, OCCASIONALLY FLOODED-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~shrink-swell (very limited)	1.00	~excess fines (thickest layer)	1.00	~excess fines (bottom layer)	1.00	~too clayey (very limited)	1.00	~wetness (very limited)	1.00
	~wetness (very limited)	1.00	~excess fines (bottom layer)	1.00	~excess fines (thickest layer)	1.00	~wetness (very limited)	1.00	~flooding (moderately limited)	0.60
									~too clayey (moderately limited)	0.53

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	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
50: Cotter, RARELY FLOODED-----	Moderately limited		Very limited		Very limited		Moderately limited		Slightly limited	
	~shrink-swell (moderately limited)	0.45	~excess fines (thickest layer)	1.00	~excess fines (bottom layer)	1.00	~too clayey (moderately limited)	0.50	~cutbanks cave (slightly limited)	0.29
			~excess fines (bottom layer)	1.00	~excess fines (thickest layer)	1.00				
51B: Deepwater-----	Very limited		Very limited		Very limited		Not limited		Limited	
	~low strength (very limited)	1.00	~excess fines (thickest layer)	1.00	~excess fines (bottom layer)	1.00			~wetness (limited)	0.73
	~shrink-swell (moderately limited)	0.59	~excess fines (bottom layer)	1.00	~excess fines (thickest layer)	1.00			~too clayey (moderately limited)	0.38
									~cutbanks cave (slightly limited)	0.29
51C2: Deepwater, ERODED-----	Very limited		Very limited		Very limited		Not limited		Limited	
	~low strength (very limited)	1.00	~excess fines (thickest layer)	1.00	~excess fines (bottom layer)	1.00			~wetness (limited)	0.73
	~shrink-swell (moderately limited)	0.59	~excess fines (bottom layer)	1.00	~excess fines (thickest layer)	1.00			~too clayey (moderately limited)	0.38
									~cutbanks cave (slightly limited)	0.29
52: Moniteau, RARELY FLOODED	Very limited		Very limited		Very limited		Very limited		Very limited	
	~wetness (very limited)	1.00	~excess fines (thickest layer)	1.00	~excess fines (bottom layer)	1.00	~wetness (very limited)	1.00	~wetness (very limited)	1.00
	~shrink-swell (slightly limited)	0.12	~excess fines (bottom layer)	1.00	~excess fines (thickest layer)	1.00			~cutbanks cave (slightly limited)	0.29
									~too clayey (slightly limited)	0.03

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	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
53: Quarles, RARELY FLOODED-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~wetness (very limited)	1.00	~excess fines (thickest layer)	1.00	~excess fines (bottom layer)	1.00	~wetness (very limited)	1.00	~wetness (very limited)	1.00
	~shrink-swell (limited)	0.66	~excess fines (bottom layer)	1.00	~excess fines (thickest layer)	1.00			~cutbanks cave (slightly limited)	0.29
									~too clayey (slightly limited)	0.27
54B: Bucklick-----	Moderately limited		Very limited		Very limited		Very limited		Moderately limited	
	~shrink-swell (moderately limited)	0.45	~excess fines (thickest layer)	1.00	~excess fines (bottom layer)	1.00	~too clayey (very limited)	1.00	~too clayey (moderately limited)	0.38
			~excess fines (bottom layer)	1.00	~excess fines (thickest layer)	1.00	~too acid (slightly limited)	0.12	~cutbanks cave (slightly limited)	0.29
55B: Bolivar-----	Moderately limited		Not Rated		Not Rated		Slightly limited		Limited	
	~depth to bedrock (moderately limited)	0.57	Not Rated		Not Rated		~too clayey (slightly limited)	0.25	~depth to bedrock (limited)	0.75
			~excess fines (thickest layer)	1.00	~excess fines (thickest layer)	1.00	~depth to bedrock (slightly limited)	0.16	~cutbanks cave (slightly limited)	0.29
							~too acid (slightly limited)	0.12		
55C: Bolivar-----	Moderately limited		Not Rated		Not Rated		Slightly limited		Limited	
	~depth to bedrock (moderately limited)	0.57	Not Rated		Not Rated		~too clayey (slightly limited)	0.25	~depth to bedrock (limited)	0.75
			~excess fines (thickest layer)	1.00	~excess fines (thickest layer)	1.00	~depth to bedrock (slightly limited)	0.16	~cutbanks cave (slightly limited)	0.29
							~too acid (slightly limited)	0.12		

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	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
56B: Barco-----	Moderately limited ~depth to bedrock (moderately limited)	0.57	Not Rated Not Rated  ~excess fines (thickest layer)	  1.00	Not Rated Not Rated  ~excess fines (thickest layer)	  1.00	Limited ~too sandy (limited) ~too clayey (slightly limited) ~depth to bedrock (slightly limited)	 0.74  0.21 0.16	Limited ~depth to bedrock (limited) ~cutbanks cave (slightly limited)	 0.75  0.29
56C: Barco-----	Moderately limited ~depth to bedrock (moderately limited)	0.57	Not Rated Not Rated  ~excess fines (thickest layer)	  1.00	Not Rated Not Rated  ~excess fines (thickest layer)	  1.00	Limited ~too sandy (limited) ~too clayey (slightly limited) ~depth to bedrock (slightly limited)	 0.74  0.21 0.16	Limited ~depth to bedrock (limited) ~cutbanks cave (slightly limited)	 0.75  0.29
57B: Liberal-----	Very limited ~shrink-swell (very limited) ~depth to bedrock (moderately limited) ~wetness (slightly limited)	1.00  0.36 0.12	Very limited ~excess fines (thickest layer) ~excess fines (bottom layer)	1.00 1.00	Very limited ~excess fines (bottom layer) ~excess fines (thickest layer)	1.00 1.00	Very limited ~too clayey (very limited) ~wetness (slightly limited)	1.00  0.12	Very limited ~wetness (very limited) ~too clayey (moderately limited) ~cutbanks cave (slightly limited)	1.00  0.38 0.29
58: Hartwell-----	Very limited ~wetness (very limited) ~shrink-swell (limited)	1.00  0.87	Very limited ~excess fines (thickest layer) ~excess fines (bottom layer)	1.00 1.00	Very limited ~excess fines (bottom layer) ~excess fines (thickest layer)	1.00 1.00	Very limited ~too clayey (very limited) ~wetness (very limited)	1.00  1.00	Very limited ~wetness (very limited) ~too clayey (moderately limited) ~cutbanks cave (slightly limited)	1.00  0.53 0.29

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	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
59B: Hartville-----	Very limited ~shrink-swell (very limited) ~wetness (slightly limited)	1.00  0.26	Very limited ~excess fines (thickest layer) ~excess fines (bottom layer)	1.00  1.00	Very limited ~excess fines (bottom layer) ~excess fines (thickest layer)	1.00  1.00	Very limited ~too clayey (very limited) ~too acid (slightly limited) ~wetness (slightly limited)	1.00  0.30  0.26	Very limited ~cutbanks cave (very limited) ~wetness (very limited) ~too clayey (moderately limited)	1.00  1.00  0.53
60B: Barden-----	Limited ~shrink-swell (limited) ~wetness (slightly limited)	0.71  0.12	Very limited ~excess fines (thickest layer) ~excess fines (bottom layer)	1.00  1.00	Very limited ~excess fines (bottom layer) ~excess fines (thickest layer)	1.00  1.00	Limited ~too clayey (limited) ~wetness (slightly limited)	0.72  0.12	Very limited ~wetness (very limited) ~too clayey (moderately limited) ~cutbanks cave (slightly limited)	1.00  0.47  0.29
61B: Summit-----	Very limited ~shrink-swell (very limited) ~wetness (slightly limited)	1.00  0.12	Very limited ~excess fines (thickest layer) ~excess fines (bottom layer)	1.00  1.00	Very limited ~excess fines (bottom layer) ~excess fines (thickest layer)	1.00  1.00	Very limited ~too clayey (very limited) ~wetness (slightly limited) ~small stones (slightly limited)	1.00  0.12  0.03	Very limited ~wetness (very limited) ~too clayey (moderately limited) ~cutbanks cave (slightly limited)	1.00  0.60  0.29
66C: Eldorado-----	Not limited		Very limited ~excess fines (thickest layer) ~excess fines (bottom layer)	1.00  1.00	Possible source ~possible source (bottom layer) ~possible source (thickest layer)	0.50  0.50	Very limited ~small stones (very limited) ~area reclaim (very limited) ~too clayey (slightly limited)	1.00  1.00  0.21	Very limited ~cutbanks cave (very limited) ~too clayey (moderately limited)	1.00  0.33

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	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
66D: Eldorado-----	Not limited		Very limited ~excess fines (thickest layer) ~excess fines (bottom layer)	1.00 1.00	Possible source ~possible source (bottom layer) ~possible source (thickest layer)	0.50 0.50	Very limited ~small stones (very limited) ~area reclaim (very limited) ~slope (limited)	1.00 1.00 0.63	Very limited ~cutbanks cave (very limited) ~slope (limited) ~too clayey (moderately limited)	1.00 0.63 0.30
67C: Bardley-----	Very limited ~depth to bedrock (very limited) ~shrink-swell (slightly limited)	1.00 0.07	Very limited ~excess fines (thickest layer) ~excess fines (bottom layer)	1.00 1.00	Very limited ~excess fines (bottom layer) ~excess fines (thickest layer)	1.00 1.00	Very limited ~too clayey (very limited) ~small stones (limited) ~depth to bedrock (limited)	1.00 0.97 0.77	Very limited ~hard bedrock <40" (very limited) ~too clayey (very limited) ~cutbanks cave (slightly limited)	1.00 1.00 0.29
67D: Bardley-----	Very limited ~depth to bedrock (very limited) ~shrink-swell (slightly limited)	1.00 0.07	Very limited ~excess fines (thickest layer) ~excess fines (bottom layer)	1.00 1.00	Very limited ~excess fines (bottom layer) ~excess fines (thickest layer)	1.00 1.00	Very limited ~too clayey (very limited) ~small stones (limited) ~depth to bedrock (limited)	1.00 0.97 0.77	Very limited ~hard bedrock <40" (very limited) ~too clayey (very limited) ~slope (limited)	1.00 1.00 0.63
68D: Collinsville---	Very limited ~depth to bedrock (very limited)	1.00	Very limited ~excess fines (thickest layer) ~excess fines (bottom layer)	1.00 1.00	Very limited ~excess fines (bottom layer) ~excess fines (thickest layer)	1.00 1.00	Very limited ~depth to bedrock (very limited) ~too sandy (limited) ~slope (moderately limited)	1.00 0.79 0.37	Very limited ~hard bedrock <40" (very limited) ~slope (moderately limited) ~cutbanks cave (slightly limited)	1.00 0.37 0.29



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	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
69C: Goss-----	Slightly limited ~large stones (slightly limited)	0.17	Very limited ~excess fines (thickest layer)	1.00	Very limited ~excess fines (bottom layer)	1.00	Very limited ~small stones (very limited)	1.00	Very limited ~cutbanks cave (very limited)	1.00
	~shrink-swell (slightly limited)	0.17	~excess fines (bottom layer)	1.00	~excess fines (thickest layer)	1.00	~area reclaim (very limited)	1.00	~too clayey (very limited)	1.00
			~small stones (thickest layer)	0.22	~small stones (thickest layer)	0.22	~too clayey (slightly limited)	0.26	~large stones (slightly limited)	0.17
69D: Goss-----	Moderately limited ~shrink-swell (moderately limited)	0.36	Very limited ~excess fines (thickest layer)	1.00	Very limited ~excess fines (bottom layer)	1.00	Very limited ~small stones (very limited)	1.00	Very limited ~cutbanks cave (very limited)	1.00
	~large stones (slightly limited)	0.20	~excess fines (bottom layer)	1.00	~excess fines (thickest layer)	1.00	~area reclaim (very limited)	1.00	~too clayey (very limited)	1.00
			~small stones (thickest layer)	0.22	~small stones (thickest layer)	0.22	~too clayey (very limited)	1.00	~slope (limited)	0.63
69E: Goss-----	Limited ~slope (limited)	0.67	Very limited ~excess fines (thickest layer)	1.00	Very limited ~excess fines (bottom layer)	1.00	Very limited ~small stones (very limited)	1.00	Very limited ~cutbanks cave (very limited)	1.00
	~shrink-swell (moderately limited)	0.36	~excess fines (bottom layer)	1.00	~excess fines (thickest layer)	1.00	~slope (very limited)	1.00	~slope (very limited)	1.00
	~large stones (slightly limited)	0.20	~small stones (thickest layer)	0.22	~small stones (thickest layer)	0.22	~area reclaim (very limited)	1.00	~too clayey (very limited)	1.00
70E: Hector, STONY--	Very limited ~depth to bedrock (very limited)	1.00	Very limited ~excess fines (thickest layer)	1.00	Very limited ~excess fines (bottom layer)	1.00	Very limited ~depth to bedrock (very limited)	1.00	Very limited ~hard bedrock <40" (very limited)	1.00
	~slope (slightly limited)	0.08	~excess fines (bottom layer)	1.00	~excess fines (thickest layer)	1.00	~slope (very limited)	1.00	~slope (very limited)	1.00
							~small stones (limited)	0.88	~cutbanks cave (slightly limited)	0.29

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72E: Gasconade-----	Very limited ~depth to bedrock (very limited) ~slope (limited) ~large stones (moderately limited)	1.00  0.92  0.50	Very limited ~excess fines (thickest layer) ~excess fines (bottom layer) ~small stones (thickest layer)	1.00  1.00  0.66	Limited ~excess fines (bottom layer) ~excess fines (thickest layer) ~small stones (thickest layer)	0.99  0.99  0.66	Very limited ~depth to bedrock (very limited) ~small stones (very limited) ~large stones >25% (very limited)	1.00  1.00  1.00	Very limited ~hard bedrock <40" (very limited) ~slope (very limited) ~large stones (moderately limited)	1.00  1.00  0.50
75B: Newtonia-----	Moderately limited ~shrink-swell (moderately limited)	0.41	Very limited ~excess fines (thickest layer) ~excess fines (bottom layer)	1.00  1.00	Very limited ~excess fines (bottom layer) ~excess fines (thickest layer)	1.00  1.00	Limited ~too clayey (limited)	0.96	Slightly limited ~cutbanks cave (slightly limited) ~too clayey (slightly limited)	0.29  0.26
94: Kanima-----	Very limited ~slope (very limited)	1.00	Very limited ~excess fines (thickest layer) ~excess fines (bottom layer)	1.00  1.00	Possible source ~excess fines (thickest layer) ~possible source (bottom layer)	1.00  0.29	Very limited ~small stones (very limited) ~area reclaim (very limited) ~slope (very limited)	1.00  1.00  1.00	Very limited ~slope (very limited) ~cutbanks cave (slightly limited)	1.00  0.29
95: Aquents-----	Not Rated		Not Rated		Not Rated		Not Rated  Not Rated		Not Rated	
W: Water-----	Not rated		Not rated		Not rated		Not rated		Not rated	